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How to Control Potato Scab

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POTATO GROWERS in Iowa who have seen scab cut the quality and marketable yields of their potato crop year after year, can prevent serious scab infection by treating potato soil with sulfur. This especially applies to commercial potato production in northern Iowa. Home growers may find the sulfur treatment useful, too.

Scab is the most serious potato disease in Iowa. Each year it disfigures tubers by causing deep pits —or it may cause a shallow roughness of the surface. Because of this, scabbed tubers are hard to market, resulting in lower grades and prices. Housewives don't like scabby potatoes because of the excessive amount of "deep" peeling required.

We have successfully controlled potato scab in peat soils at Crystal Lake, Clear Lake and Armstrong with sulfur in tests conducted by Iowa State College.

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Cobblers Susceptible

Commercial potato production is a highly specialized type of farming. In Iowa, it's largely limited to the peat beds in the northern part of the state where relatively good yields are obtained. Unfortunately, the most commonly grown potato variety, Cobbler, is very susceptible to scab.

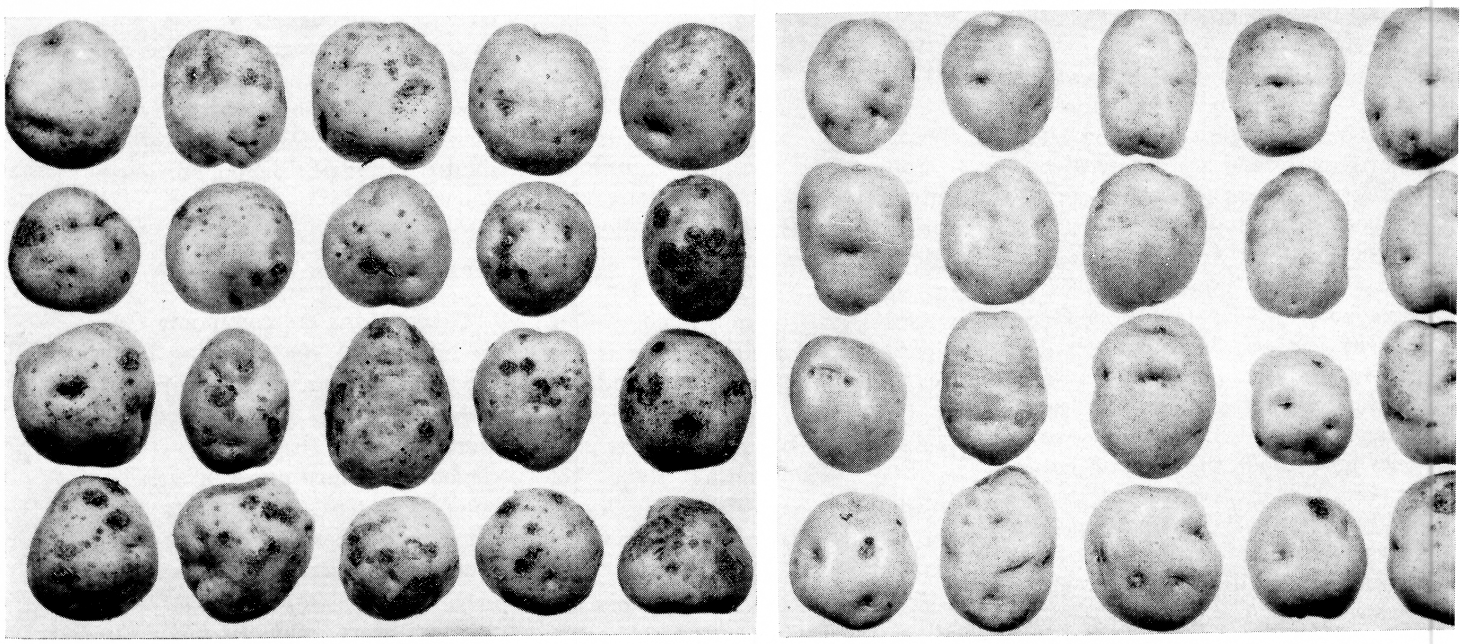
Potato scab is caused by a bacterial-like organism called *Streptomyces scabies* which thrives in most potato soils. It can live for some time in the soil even if potatoes aren't grown. In practice, it's usually safe, from the standpoint of scab control, to replant potatoes in a field if other crops have been grown there for 3 or 4 years.

Here's the Clue

One important weakness of the scab disease organism is that it can't tolerate acid soils. This, coupled with the fact that potatoes grow quite well in soils too acid for severe scab development, furnishes one basis for controlling scab.

Several years ago, we ran tests to determine the effects of applying sulfur on potato soils. Sulfur makes the soil slightly acid—and, thus, unfavorable for scab development. We broadcast finely ground sulfur over the soil and thoroughly disked it in just before planting in the spring. In gardens or small test plots, ground sulfur may be spread by hand and later thoroughly disked into the soil before potatoes are planted. We suggest wearing goggles to protect your eyes from sulfur dust.

In one large peat bed near Crystal Lake, scab was so severe (see table 1) that susceptible varieties couldn't be grown profitably. Our test showed that 4,000 to 6,000 pounds of sulfur per acre were so effective that U. S. Grade No. 1 potatoes were easily obtained (see picture). A rate of 2,000 pounds didn't make the soil acid enough to reduce scab to any great extent. The 4,000- and 6,000-pound applications increased total yields and decidedly increased yields of marketable tubers because of scab reduction.



Left: Scabbed Cobbler potatoes from untreated soil at Crystal Lake. Right: Cobbler potatoes from plots receiving 6,000 pounds of sulfur broadcast 1 year earlier. Elsewhere, lower rates were effective. High rates such as this would be extremely dangerous unless preliminary trials had been made.

Usually Lower Rates Good

In other peat beds in northern Iowa, scab has been controlled by lower rates of sulfur. At Clear

Lake, 2,000 pounds were effective. And, at Armstrong, low rates of only 500 pounds per acre were enough.

Total yields of Cobblers were increased every year almost 50 bushels per acre by sulfur applications at Crystal Lake. Although the total yields at Clear Lake and Armstrong weren't significantly increased by broadcast sulfur, the yields from sulfur-treated plots were slightly higher than from the untreated plots. The sulfur treatment did reduce scab.

In essentially similar tests, total yields of more than 12 other varieties were consistently increased. These increases averaged about 50 bushels per acre, while, at the same time, scab was appreciably reduced. The combination of these two factors resulted in very decided increases in marketable tubers.

Affect Table Quality?

To see if the sulfur treatments might have affected table quality, we ran extensive tests on potatoes harvested from sulfur-treated fields.

We could find no consistent differences in flavor or aroma. The starch content of potatoes from sulfur-treated soil was the same as that of potatoes from untreated soil.

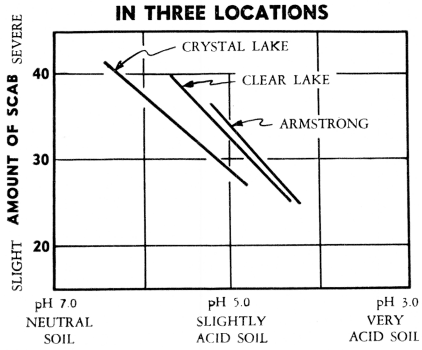
Treatment Lasts

We found satisfactory disease control at Crystal Lake lasting 3 years after sulfur had been broadcast. This indicates it's not necessary to apply sulfur every year. The greatest danger in the use of sulfur is that of applying more than is necessary or desirable. Certain soils, particularly those with low alkaline reserves, may easily be made too acid for good growth of potatoes and other crops.

It's up to each grower to find out how much sulfur his fields need. Small amounts, such as 500 to 1,000 pounds per acre, should be broadcast first. (Even lower rates, 100 to 200 pounds per acre, should be used on mineral soils.) Then, if scab isn't reduced, sulfur may be tried again the next year, applying a smaller amount than the year before. Since sulfur has a residual effect in the soil, it's easy to apply too much.

The graph shows the relationship existing between scab severity and soil acidity as determined for the conditions in the peat soils of northern Iowa. As the soil is made more acid by sulfur treatments, the amount of scab is reduced more and more. There's no clearly defined point at which scab is eliminated. However, in the more acid soils, scab is reduced until it's of only slight importance.

THE RELATION OF SOIL ACIDITY TO POTATO SCAB SEVERITY IN THREE LOCATIONS



Other Applications

Although our tests were confined to peat soils, it seems safe to assume that work done elsewhere on mineral soils, at Wisconsin, Michigan and New Jersey, would apply to mineral soils in Iowa. Investigators in these states have found that sulfur applied in rather low rates—sometimes as low as 100 to 200 pounds per acre—will satisfactorily reduce scab. Legumes usually don't grow well on acid soil. Under your conditions higher rates may prove necessary for scab control. So sulfur treatments should be confined to potato land.

It also seems best for the home gardener to avoid the use of barnyard manure on potato land. Other states have found that using manure on potato plots has increased amounts of scab considerably. Commercial fertilizers ordinarily available would be more desirable than manure from the standpoint of potato scab control.

Scab-resistant potato varieties such as Ontario and Menominee are now available, although they have the disadvantage of being late. It's probable that earlier scab-resistant varieties will be released within the next few years.

In Brief . . .

Sulfur treatment of Iowa peat soils is of real value in controlling potato scab, providing proper amounts of sulfur are used. In general, 500 to 1,000 pounds per acre should be tried experimentally on peat soil in only a portion of the field.

For preliminary trials, a narrow strip might be treated through the center of the field. Leave an untreated area so you can compare differences in results between treated and untreated portions.

If you don't get effective control with light applications, make additional applications the next year. Be careful to avoid making the soil too acid. Lighter applications should be more effective on mineral soils than on peat soils.

TABLE 1.
Tuber Appearance and Yields of Cobbler Potatoes Grown on Sulfur-Treated Peat Soils

Location	Rate of sulfur lbs./A.	Tuber skin appearance	Scab-free tubers bu./A.	Marketable tubers bu./A.	All tubers bu./A.
Crystal Lake	none	russet	4	366	422
	2000	intermediate	38	449	474
	4000	bright	151	476	488
	6000	bright	196	462	467
Clear Lake	none	russet	52	236	349
	1000	intermediate	76	282	363
	2000	bright	154	310	357
	4000	bright	190	325	358
Armstrong	none	bright	87	302	415
	500	bright	111	363	462
	1000	bright	153	349	424
	2000	bright	152	377	433